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Iceberg capsize hydrodynamics and the source of glacial earthquakes LYNN KALUZIENSKI, JUSTIN BURTON, Department of Physics, Emory University, MAC CATHLES, Department of Earth and Environmental Sciences, University of Michigan — Accelerated warming in the past few decades has led to an increase in dramatic, singular mass loss events from the Greenland and Antarctic ice sheets, such as the catastrophic collapse of ice shelves on the western antarctic peninsula, and the calving and subsequent capsize of cubic-kilometer scale icebergs in Greenland's outlet glaciers. The latter has been identified as the source of long-period seismic events classified as glacial earthquakes, which occur most frequently in Greenland's summer months. The ability to partially monitor polar mass loss through the Global Seismographic Network is quite attractive, yet this goal necessitates an accurate model of a source mechanism for glacial earthquakes. In addition, the detailed relationship between iceberg mass, geometry, and the measured seismic signal is complicated by inherent difficulties in collecting field data from remote, ice-choked fjords. To address this, we use a laboratory scale model to measure aspects of the post-fracture calving process not observable in nature. Our results show that the combination of mechanical contact forces and hydrodynamic pressure forces generated by the capsize of an iceberg adjacent to a glacier's terminus produces a dipolar strain which is reminiscent of a single couple seismic source.

Justin Burton
Department of Physics, Emory University

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